Design Document

Jacob Pugsley, Tyler Higgins, Julian Keller
CS 447

October 24, 2019

1 Game Overview

This game will be a top-down 2D dungeon crawler game. Your character goes through a randomized dungeon full of enemies that will chase after the player, as well as puzzles and obstacles, where the goal is to defeat the boss and escape. There will be four classes that a player can choose from:

- Knight - A class that is on the front line with balanced health and stamina, hits with moderate damage.
- Mage - A class that uses elemental magic(earth,wind,fire,water) and can also conjure buffs for the other players and debuffs for enemies, hits can vary from small to large amount of damage, depending on the enemies's resistance to certain elements (i.e., fire and water)
- Archer - Ranged class that can shoot arrows long distances for a small to moderate amount of damage.
- Tank - Class that can deal a large amount of damage and has high health, but is very slow.

This game will be like Gauntlet, as it will have four classes and enemies that will try to hunt you down and to reach a goal you will have to solve puzzles or find a key to get to other rooms. It will also feature loot such as gold or other valuable items to collect throughout the map.

For collectables there will be weapon upgrades, buffs, and debuffs. There will also be health potions and mana potions that, if not already full, will fill your health bar or mana bar.

There will be scrolling as the player moves through the map.

What else makes the game fun? The game will be networked and allow up to four players to play the game together in real-time. This will add an enjoyable social component to the game.

2 User Interface

There will be a top-down 2D scrolling map. Every class will have a health bar displayed, and if you are a mage, then there will be an additional mana bar. If you are an archer, there will be an additional "range" bar to aid the player in detecting how far the arrow will travel on the map. There will also be an inventory box, an indicator for how much "gold" of valuables you've collected, and an indicator of other players (if any) and their health. Players will control their character with their computer's keyboard.

A level will have walls, obstacles and puzzles, and doors that the player will have to navigate through in order to get to the final boss and escape. There will also be enemies randomly spawned on the map. Also on the map will be various chests and breakable boxes that will carry gold, buffs, debuffs, and weapon upgrades.

Enemies will not move, or come after the player(s) until the player(s) are in the same room as the player(s) are in. Then they will follow the player(s) around and try to attack the player(s).

3 Entities

The required entities will include the following:

- Player: The player entity will be one of four classes (Knight, Mage, Archer, Tank) that will be fighting to escape the dungeon. While also getting riches along the way.
- Enemies: The enemies entity will try and take down the player(s) before they can reach the goal. They will be following the player once the player enters the same room as the enemy.
- Boss: This entity will be way more powerful and have better health than the other enemies, and will be the last enemy the player(s) will have to encounter before reaching the goal.

- Loot: This will be chests and/or breakable entites that the player(s) can collect that either buffs, debuffs, upgrades their weapon or adds "gold" to their stash.
- Potion: This power-up entity will either increase a player's health if their health is not maxed, or mana if a mage's mana is not maxed.
- Map tiles: There will be different configurations of map tiles that will be used to help generate a "randomized" map.

4 Sticking Points

Forseeable sticking points to this project include:

- An Isometric 2D map will be a bit of a challenge to code and make sprites for. We could make the sprites by taking pictures of someone in costumes at the correct angle. We will begin with a top-down 2D scrolling game before we dive into isometric 2D.
- We are just learning networking and that will probably be a bit of a challenge to debug and reduce latency.
- Randomized maps will be difficult to make a map playable(i.e. rooms with no exit). We would set rules on certain tiles to alleviate issues when the map is generating. We can fall back to pre-generated maps if we need to, though it will be more time-consuming.

5 High Bar Goals

- Upgrade Items: Weapon upgrades and buff/debuff items.
- Isometric 2D world: convert our top-down maps/graphics to isometric 2D
- Breakable Items: These items would be boxes/barrels that can be breakable with an attack and have upgrades/buffs/potions in them.
- Puzzles: Simple puzzles/mazes that the player(s) will have to solve to move on to another room or the boss level.
- Random Generated Maps: We would create tile sets that we can generate on a grid randomly.
- Custom Sounds: If time allows sound effects and background music will be written and created rather than using curated sounds.

6 Development Strategy

We will be mostly starting our code from scratch.

Milestones

1. Create entity art and tilemap art
2. Implement basic game with an empty scrolling map and movement for a character
3. Create a backend server with basic networking implemented
4. Make enemy entities with networking
5. Reuse Dijkstra's Algorithm code from Project 1
6. Create items and other collectables

7. Implement sound and animations

Roles

- Tyler - Networking and Character entities
- Jacob - Item entities and Networking
- Julian - Level generation and artwork

We will expect to finish Milestone 5 - Dijkstra's Algorithm, by the lab session November 20th.

7 Low Bar Checklist

- Top-down 2D map/entities: This will be on a "world grid" where the player will navigate throughout the game.
- Effective Enemy AI: When the player enters the same room as the enemies, they will use Dijkstra's algorithm to navigate to the player to try and kill the player.
- Four Classes: Each class with their own unique abilities that a player can choose from.
- Networking: Network so players on other machines can join in and escape the dungeon together in real-time.
- Dungeon Maps: We will create tile sets that we can use to generate two dungeons.
- Boss Room: The final room that houses the boss.
- Boss: The final enemy in the game that is hart to defeat.
- Potions: Health and mana potions that "heal" the player and increase their mana.
- Loot: Gold or collectables that increase your "points".
- 'Triggered' State Change Events: Enemies will start following the player once a player is in the same room as the enemies.
- Smooth Movement: Entities will move smoothly during gameplay.
- Custom Artwork: The majority of the artwork will be created from scratch.
- Music and Sound Effects: The game will include background music and sound effects.